



# Introduction to VMware EVO: RAIL

WHITE PAPER

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## Introducing VMware EVO: RAIL

VMware EVO: RAIL™ combines compute, networking, and storage resources into a hyper-converged infrastructure appliance to create a simple, easy to deploy, all-in-one solution offered by VMware qualified partners.

### *Simplicity Transformed*

EVO: RAIL enables power-on to VM creation in minutes, radically easy VM deployment, one-click non-disruptive patch and upgrades, simplified management...you get the idea.

### *Software-Defined Building Block*

EVO: RAIL is a scalable Software-Defined Data Center (SDDC) building block that delivers compute, networking, storage, and management to empower private/hybrid-cloud, end-user computing, test/dev, and branch office environments.

### *Trusted Foundation*

Building on the proven technology of VMware vSphere®, vCenter Server™, and VMware Virtual SAN™, EVO: RAIL delivers the first hyper-converged infrastructure appliance 100% powered by VMware software.

### *Highly Resilient by Design*

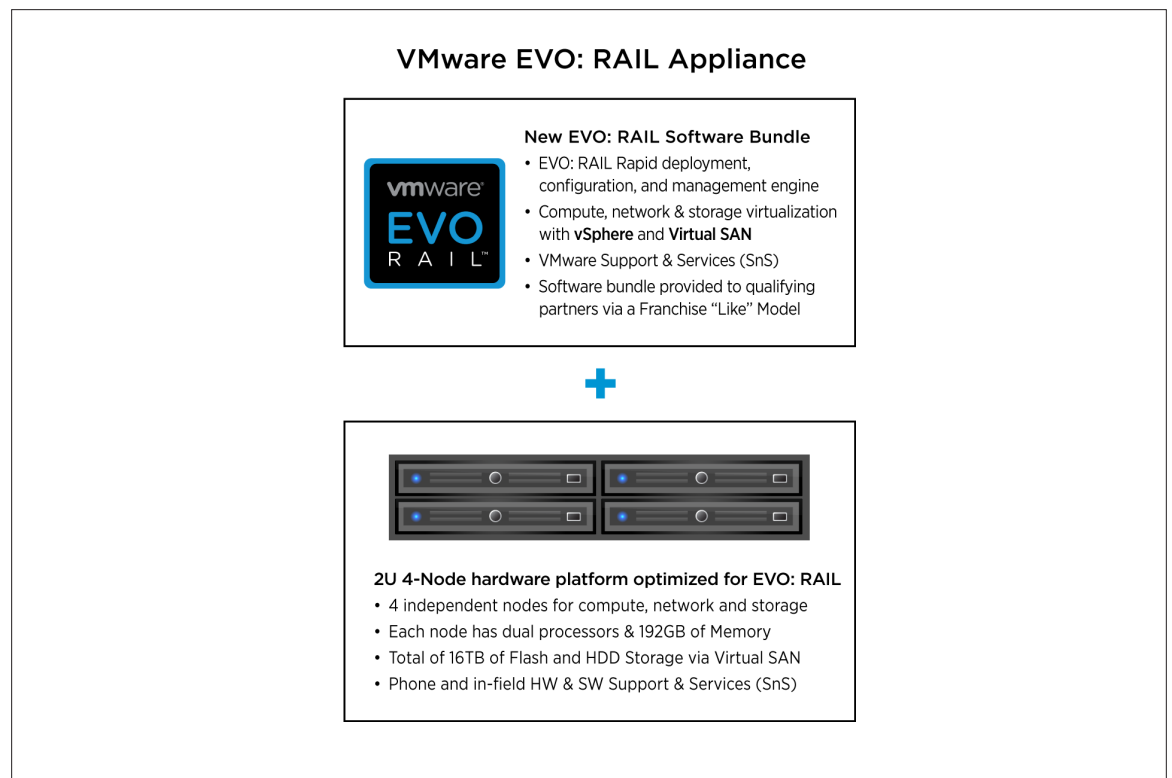
Resilient appliance design starting with four independent hosts and a distributed Virtual SAN datastore ensures zero application downtime during planned maintenance or during disk, network, or host failures.

### *Infrastructure at the Speed of Innovation*

Meet accelerating business demands by simplifying infrastructure design with predictable sizing and scaling, by streamlining purchase and deployment with a single appliance SKU, and by reducing CapEx and OpEx.

### *Freedom of Choice*

EVO: RAIL is delivered as a complete appliance solution with hardware, software, and support through leading systems vendors; customers choose their preferred brand.



**Hardware**

VMware is not entering the hardware market. The EVO: RAIL software bundle is available to qualifying EVO: RAIL partners. The partner, in turn, sells the hardware with integrated EVO: RAIL software, and provides all hardware and software support to customers.

**Appliance**

Each EVO: RAIL appliance has four independent nodes with dedicated computer, network, and storage resources and dual, redundant power supplies.

**Nodes**

Each of the four EVO: RAIL nodes have:

- Two Intel E5-2620v2 six-core CPUs
- 192GB of memory
- One SLC SATADOM or SAS HDD for the ESXi™ boot device
- Three SAS 10K RPM 1.2TB HDD for the VMware Virtual SAN™ datastore
- One 400GB MLC enterprise-grade SSD for read/write cache
- One Virtual SAN-certified pass-through disk controller
- Two 10GbE NIC ports (configured for either 10GBase-T or SFP+ connections)
- One 1GbE IPMI port for remote (out-of-band) management

**Fault Tolerance and Reliability**

Each EVO: RAIL appliance has the following hardware components and reliability features:

- Four ESXi hosts in a single appliance enables resiliency for hardware failures or maintenance
- Two fully redundant power supplies
- Redundant 2 x 10GbE NIC ports per node for all communication
- ESXi boot device, HDDs, and SSD are all enterprise-grade

**Automatic Scale-Out**

EVO: RAIL Version 1.0 can scale out to four appliances – for a total of 16 ESXi hosts, 1 Virtual SAN datastore backed by a single vCenter Server and EVO: RAIL instance. EVO: RAIL handles deployment, configuration, and management, allowing the compute capacity and the Virtual SAN datastore to grow automatically. New appliances are automatically discovered and easily added to an EVO: RAIL cluster with a few mouse clicks.

**Software**

EVO: RAIL delivers the first hyper-converged infrastructure appliance 100% powered by VMware's proven suite of core products. The EVO: RAIL software bundle is fully loaded onto the EVO: RAIL qualified partner's hardware. This software bundle is comprised of:

- EVO: RAIL Deployment, Configuration, and Management
- VMware vSphere® Enterprise Plus, including ESXi for compute
- Virtual SAN for storage
- vCenter Server™
- vCenter Log Insight™

EVO: RAIL is optimized for the new VMware user as well as for experienced administrators. Minimal IT experience is required to deploy, configure, and manage EVO: RAIL, allowing it to be used where there is limited or no IT staff on-site. As EVO: RAIL utilizes VMware's core products, administrators can apply existing VMware knowledge, best practices, and processes.

EVO: RAIL leverages the same database as vCenter Server, so any changes in EVO: RAIL configuration and management are also reflected in vCenter Server and vice-versa.

## Compute, Networking, Storage, and Management

### EVO: RAIL Compute

#### *Virtual Machine Density*

- EVO: RAIL is sized to run approximately 100 average-sized, general-purpose, data center VMs. Actual capacity varies by VM size and workload. There are no restrictions on application type. EVO: RAIL supports any application that a customer would run on vSphere.

**General-purpose VM profile:** 2 vCPU, 4GB vMEM, 60GB of vDisk, with redundancy

- EVO: RAIL is optimized for VMware Horizon® View with configuration options that allow up to 250 View VMs on a single EVO: RAIL appliance. Actual capacity varies by desktop size and workload.

**Horizon View virtual desktop profile:** 2vCPU, 2GB vMEM, 32GB vDisk linked clones

### EVO: RAIL Network

#### *Connections*

- Each node in EVO: RAIL has two 10GbE network ports. Each port must be connected to a 10GbE top-of-rack switch that has IPv4 and IPv6 multicast enabled.
- Remote/lights out management is available on each node through a 1GbE IPMI port that can connect to a management network. NOTE: In some configurations, there may be additional 1GbE ports that are covered and disabled.

#### *Traffic*

- EVO: RAIL supports four types of traffic: Management, vSphere vMotion®, Virtual SAN, and Virtual Machine. Traffic isolation on separate VLANs is recommended for vSphere vMotion, Virtual SAN, and VMs. EVO: RAIL Version 1.0 does not put management traffic on a VLAN.
- IPv4 and IPv6 multicast must be enabled on the top-of-rack switch(es). EVO: RAIL's automated scale-out feature uses IPv6. (It is not required for your complete network to support IPv6.)
- VLANs are not required when customizing a EVO: RAIL configuration; however, they are highly recommended. When using the *Just Go!* option, it is assumed VLANs are configured.

### EVO: RAIL Storage

EVO: RAIL creates a single Virtual SAN datastore from all local HDDs on each ESXi host in a EVO: RAIL cluster. Virtual SAN read caching and write buffering uses SSD capacity. Total storage capacity is 16TB per EVO: RAIL appliance:

- 14.4TB HDD capacity (approximately 13TB usable) per appliance, allocated to the Virtual SAN datastore for virtual machines
- 1.6TB SSD capacity per appliance for read/write cache
- Size of pre-provisioned management VM: 30GB

### EVO: RAIL Management

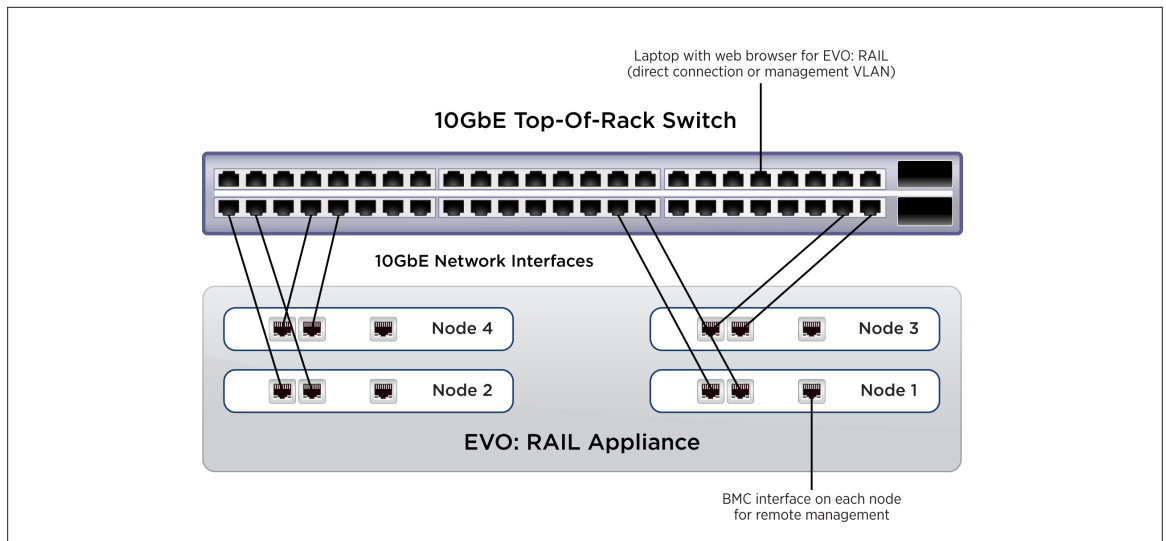
EVO: RAIL enables deployment, configuration, and management through a new, intuitive HTML5-based user interface showcased in the next section. EVO: RAIL provides new non-disruptive updates for VMware software with zero downtime and automatic scale-out of EVO: RAIL appliances.

## Deployment, Configuration, and Management

### EVO: RAIL Deployment

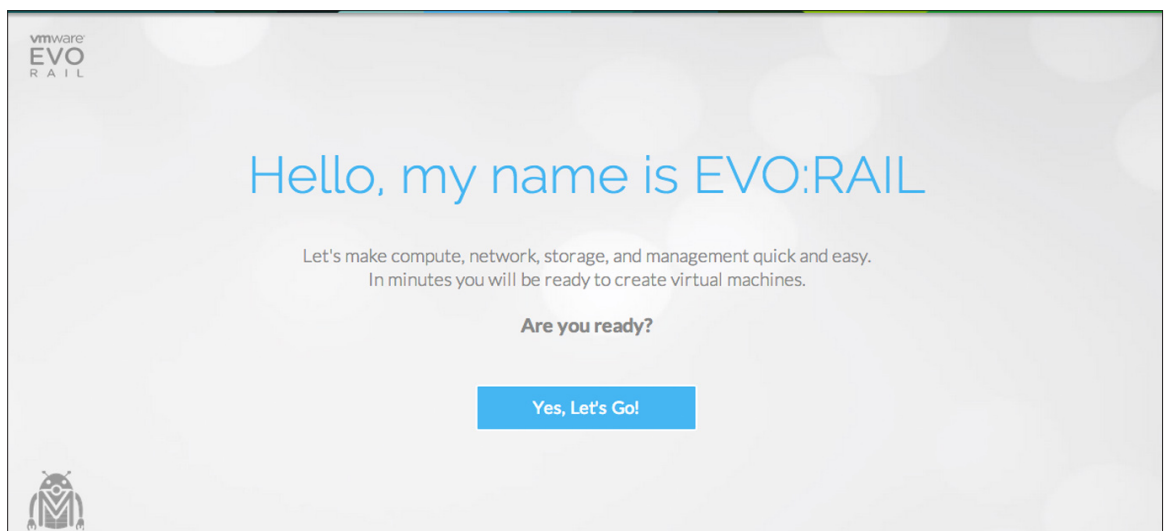
EVO: RAIL deployment is simple, with just four steps:

- Step 1.** Decide on EVO: RAIL network topology (VLANs and top-of-rack switch). Important instructions for your top-of-rack switch are provided in the EVO: RAIL User Guide.
- Step 2.** Rack and cable: connect the 10GbE adapters on EVO: RAIL to the 10GbE top-of-rack switch.
- Step 3.** Power on EVO: RAIL.



**Figure 1.** Rear view of one deployment of EVO: RAIL to a top-of-rack switch (varies by appliance vendor)

- Step 4.** Connect a client workstation/laptop to the top-of-rack switch and configure the network address to talk to EVO: RAIL. Then browse<sup>1</sup> to the EVO: RAIL IP address, for example <https://192.168.10.200:7443>.



**Figure 2.** Initial user interface

<sup>1</sup> Firefox, Chrome, and IE 10+ are all supported. For specific IE instructions, see the EVO: RAIL User Guide.

### EVO: RAIL Configuration

EVO: RAIL Configuration has three options: *Just Go!* or *Customize Me!* or *Upload Configuration File*.

With *Just Go!*, EVO: RAIL automatically configures a default set of IP addresses and hostnames for extremely fast deployment in a green-field scenario. Configure your TOR switch and click the *Just Go!* button. All you have to create are two passwords.

With *Customize Me!*, customers can specify the following configuration parameters:

- **Hostnames** for vCenter Server and ESXi hosts naming scheme
- **Networking** (IP ranges and/or VLAN ID): ESXi, Virtual SAN, vSphere vMotion, vCenter Server, VM Networks
- **Passwords**: ESXi hosts and vCenter Server; optional Active Directory authentication
- **Globals**: Time zone; your existing NTP, DNS, and Proxy servers; logging: vCenter Log Insight or third-party syslog server

With *Upload Configuration File*, an existing `json` configuration file can be selected and uploaded.

EVO: RAIL verifies the configuration data, and then builds the appliance. EVO: RAIL implements data services, creates the new ESXi hosts, and configures vCenter Server. The final screen contains the link to EVO: RAIL Management.

### EVO: RAIL Management

EVO: RAIL Management provides a dashboard to view all virtual machines and arrange them with sorting and filtering. Users create virtual machines with only a few clicks to select the guest OS, VM size, VLAN, and security options. EVO: RAIL simplifies virtual machine sizing by offering single-click small, medium, and large configurations, as well as single-click security policies.

EVO: RAIL Management revolutionizes live compute management with health monitors for CPU, memory, storage, and VM usage for entire EVO: RAIL clusters, individual appliances, and individual nodes. EVO: RAIL Management streamlines log collection, licensing, and offers language choice for globalization. It also provides notifications and tracks tasks.

EVO: RAIL Management radically simplifies scale-out. Increasing compute, networking, and storage resources is as easy as powering up a new appliance to join an existing EVO: RAIL cluster. EVO: RAIL automatically distributes the configuration to seamlessly add new appliances with zero additional configuration.

EVO: RAIL Management allows users to check for vCenter, ESXi, and EVO: RAIL software upgrades. EVO: RAIL downloads and installs any patches for these VMware products. With a minimum of four independent ESXi hosts in an EVO: RAIL cluster, updates are non-disruptive and require zero downtime.

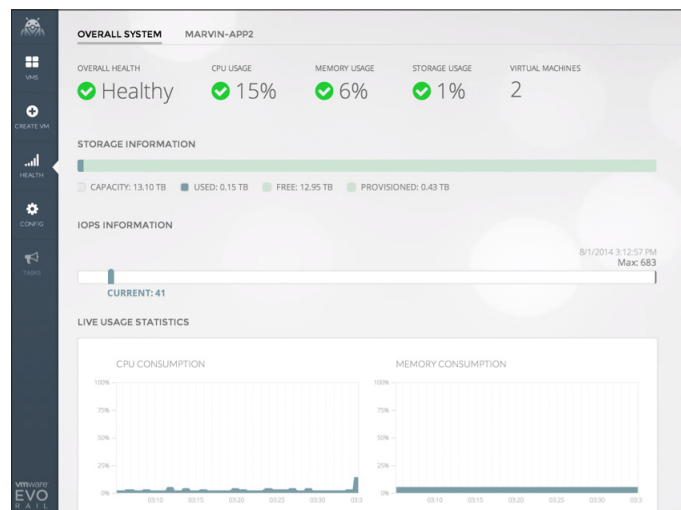


Figure 3. Health monitoring



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